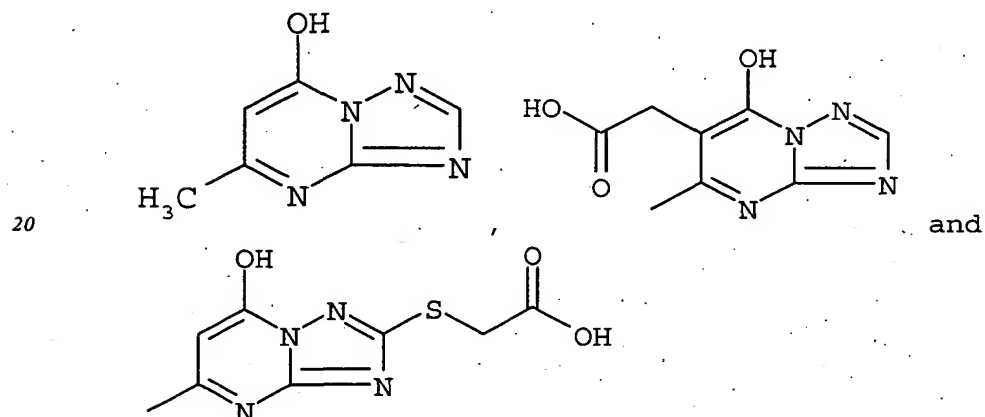


## I CLAIM:

1. A nano-porous metal oxide semiconductor with a band-gap of greater than 2.9 eV in-situ spectrally sensitized on its internal and external surface with metal chalcogenide nanoparticles with a band-gap of less than 2.9 eV containing at least one metal chalcogenide, wherein said nano-porous metal oxide further contains a triazole or diazole compound.
2. Nano-porous metal oxide according to claim 1, wherein said metal oxide is selected from the group consisting of titanium oxides, tin oxides, niobium oxides, tantalum oxides and zinc oxides.
3. Nano-porous metal oxide according to claim 1, wherein said triazole compound is a tetraazaindene.
4. Nano-porous metal oxide according to claim 3, wherein said tetraazaindene is selected from the group consisting of



5. Nano-porous metal oxide according to claim 1, wherein said nano-porous metal oxide further contains a phosphoric acid or a phosphate.
6. A process for in-situ spectral sensitization of nano-porous metal oxide semiconductor with a band-gap of greater than 2.9 eV on its internal and external surface with metal chalcogenide nanoparticles with a band-gap of less than 2.9 eV, containing at least one metal chalcogenide, comprising a metal chalcogenide-forming cycle comprising the steps of: contacting the nano-porous metal oxide with a solution of metal ions; and

contacting the nano-porous metal oxide with a solution of chalcogenide ions, wherein said solution of metal ions and/or said solution of chalcogenide ions contains a triazole or diazole compound.

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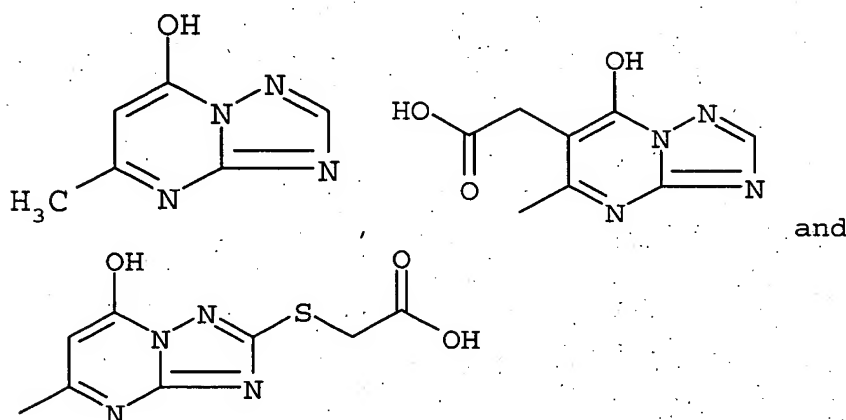
7. Process according to claim 6, wherein said contact with a solution of metal ions occurs before said contact with a solution of chalcogenide ions.

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8. Process according to claim 6, wherein said metal chalcogenide-forming cycle is repeated.

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9. Process according to claim 6, wherein said triazole or diazole compound is tetraazaindene is selected from the group consisting of

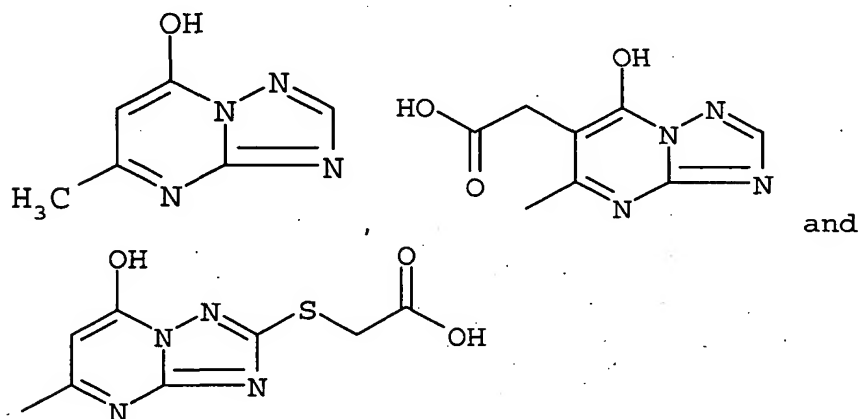


- 20 10. Process according to claim 6, wherein at the end of said metal chalcogenide-forming cycle said metal chalcogenide is rinsed with an aqueous solution containing a phosphoric acid or a phosphate.

- 25 11. A photovoltaic device comprising a nano-porous metal oxide semiconductor with a band-gap of greater than 2.9 eV in-situ spectrally sensitized on its internal and external surface with metal chalcogenide nano-particles with a band-gap of less than 2.9 eV containing at least one metal chalcogenide, wherein said  
30 nano-porous metal oxide further contains a triazole or diazole compound.

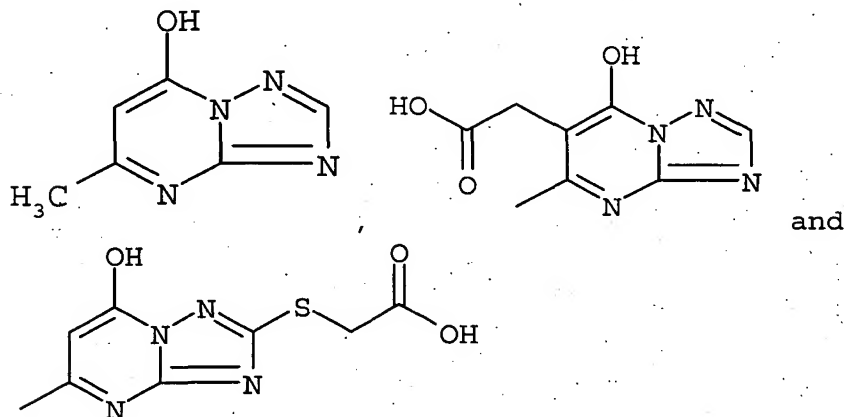
12. Photovoltaic device according to claim 11, wherein said metal oxide is selected from the group consisting of titanium oxides, tin oxides, niobium oxides, tantalum oxides and zinc oxides.
13. Photovoltaic device according to claim 11, wherein said triazole compound is a tetraazaindene.
14. Photovoltaic device according to claim 13, wherein said tetraazaindene is selected from the group consisting of

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15. Photovoltaic device according to claim 11, wherein said nano-porous metal oxide further contains a phosphoric acid or a phosphate.
16. A second photovoltaic device comprising a nano-porous metal oxide semiconductor with a band-gap of greater than 2.9 eV spectrally sensitized on its internal and external surface with metal chalcogenide nano-particles with a band-gap of less than 2.9 eV, containing at least one metal chalcogenide, prepared according to a process for in-situ spectral sensitization comprising a metal chalcogenide-forming cycle comprising the steps of: contacting the nano-porous metal oxide with a solution of metal ions; and contacting the nano-porous metal oxide with a solution of chalcogenide ions, wherein said solution of metal ions and/or said solution of chalcogenide ions contains a triazole or diazole compound.
17. Second photovoltaic device according to claim 16, wherein said contact with a solution of metal ions occurs before said contact with a solution of chalcogenide ions.

18. Second photovoltaic device according to claim 16, wherein said metal chalcogenide-forming cycle is repeated.
19. Second photovoltaic device according to claim 16, wherein said triazole or diazole compound is tetraazaindene is selected from the group consisting of



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20. Second photovoltaic device according to claim 16, wherein at the end of said metal chalcogenide-forming cycle said metal chalcogenide is rinsed with an aqueous solution containing a phosphoric acid or a phosphate.

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